

Amendments to the Claims

This listing of claims will replace all prior versions, and listings of claims in the application.

1. (Currently Amended) A transducer ~~for converting between mechanical vibration and electrical signal~~, comprising:

a housing enclosing a substantially cylindrical permanent magnet, the magnet comprising a first end face, a second end face and a curvilinear side surface; and

a coil coupled to the housing,

wherein the magnet is configured to have a side-to-side polar orientation, and

wherein the magnet and housing are configured such that the magnet moves relative to the coil both linearly and rotationally thereby converting mechanical vibration to an electrical signal.

2. (Previously Presented) The transducer of claim 1, wherein:

the magnet comprises a longitudinal axis passing through the first and second end faces; and

the magnet includes one semi-cylindrical north pole and one semi-cylindrical south pole disposed along a line that is substantially perpendicular to the longitudinal axis.

3. (Original) The transducer of claim 1, wherein the magnet is attached to the housing via a diaphragm.

4. (Previously Presented) The transducer of claim 3, wherein the diaphragm permits the magnet to vibrate linearly and rotationally within the housing.

5. (Currently Amended) The transducer of claim 1, wherein the magnet is adapted to vibrate ~~both linearly and rotationally~~ within the housing.

6. (Original) The transducer of claim 5, wherein the vibration of the magnet induces current changes in the coil.

7. (Original) The transducer of claim 1, wherein the housing includes a bobbin portion that constrains the coil to the housing.

8. (Previously Presented) A transducer ~~for converting between mechanical vibration and electrical signal~~, comprising:

a housing enclosing a substantially cylindrical permanent magnet, the magnet comprising a first end face, a second end face and a curvilinear side surface; and

a coil coupled to the housing;

wherein the magnet is configured to have a side-to-side polar orientation and is suspended in ferrofluid within the housing, and

wherein the magnet is adapted to move relative to the coil thereby converting mechanical vibration to an electrical signal.

9. (Canceled)

10. (Previously Presented) The transducer of claim 8, wherein:

the magnet comprises a longitudinal axis passing through the middle of the first and second end faces; and

the magnet includes one north pole and one south pole disposed along a line that is substantially perpendicular to the longitudinal axis.
11. (Original) The transducer of claim 8, wherein the ferrofluid acts as a liquid spring for the magnet.
12. (Original) The transducer of claim 8, wherein the ferrofluid is adapted to damp external vibrations that cause the magnet to vibrate.
13. (Original) The transducer of claim 8, wherein the ferrofluid comprises a natural or synthetic oil.
14. (Original) The transducer of claim 8, further comprising a metal insert embedded within the housing.
15. (Original) The transducer of claim 14, wherein the metal insert prevents the magnet from freely spinning within the housing.

16. (Original) The transducer of claim 8, wherein the vibration of the magnet induces current changes in the coil.

17. (Original) The transducer of claim 8, wherein the housing includes a bobbin portion that constrains the coil to the housing.

18. (Canceled)

19. (Currently Amended) The sensor array of claim 21 ~~[[18]]~~, wherein the sensors are oriented substantially in the same direction.

20. (Canceled)

21. (Previously Presented) A [[The]] sensor array for a musical instrument having a soundboard of claim 20, comprising:

a plurality of sensors for converting mechanical vibration to an electrical signal, each sensor comprising a transducer including a housing enclosing a substantially cylindrical permanent magnet, and a coil, the magnet comprising a first end face, a second end face and a curvilinear side surface,

wherein each magnet is configured to have a side-to-side polar orientation and to move relative to the coil, and

wherein a first sensor is ~~located~~ attached at a first position on the soundboard such that vibration of the first sensor is out of phase with vibration of a second sensor that is ~~located~~

attached at a second position on the soundboard during vibration at a frequency due to the natural phase relationship of the soundboard.

22. (Currently Amended) The sensor array of claim 21 [[18]], wherein the sensors are wired to an amplifier.

23. (Currently Amended) The sensor array of claim 21 [[18]], wherein the sensors are attached to an interior surface of the soundboard such that each sensor is substantially hidden from view during use of the musical instrument.

24. (Currently Amended) The sensor array of claim 21 [[18]], wherein the musical instrument is a guitar.

25. (Currently Amended) The sensor array of claim 21 [[18]], wherein each sensor further comprises ferrofluid that fills the housing and substantially surrounds the magnet.

26. (Original) The sensor array of claim 25, wherein the ferrofluid acts as a liquid spring for the magnet.

27. (Original) The sensor array of claim 25, wherein the ferrofluid is adapted to damp external vibrations that cause the magnet to vibrate.

30. (Original) The sensor array of claim 25, wherein the ferrofluid comprises a natural or synthetic oil.

31. (Currently Amended) The sensor array of claim 21 ~~[[18]]~~, wherein each sensor further comprises damping fluid filling the housing and substantially surrounding the magnet.

32. (Currently Amended) ~~[[A]]~~ The transducer of claim 1 ~~for converting between mechanical vibration and electrical signal, further comprising~~~~[[:]]~~

~~a housing enclosing a substantially cylindrical permanent magnet, the magnet comprising a first end face, a second end face and a curvilinear side surface;~~

~~a coil coupled to the housing; and~~

~~a metal insert embedded within the housing~~~~[[,]]~~

~~wherein the magnet is suspended in ferrofluid within the housing.~~

33. (Previously Presented) The transducer of claim 32, wherein the metal insert is configured such that the magnet is prevented from freely spinning within the housing.